AN-TDM-IP-1 / 2 E1 A

E1/T1 over Ethernet Multiplexer

User's Manual

AD-net Technology., LTD

AN-TDM-IP-1E1/2E1-A

E1/T1 over Ethernet Multiplexer

User's Manual

AD-net Technology., LTD

2012.03

Disclaimer

The information contained in this document is subject to change without notice and does not represent a commitment on the part of AD-net Technology., co LTD (AD-net). The information in this document is believed to be accurate and reliable; however, AD-net assumes no responsibility or liability for any errors or inaccuracies that may appear in the document.

Copyright© 2012 by AD-net Technology., co LTD All rights reserved. No part of this publication may be reproduced or distributed in any form or by any means, without prior written permission of AD-net.

Product Model:	AN-TDM-IP-1E1/2E1-A
Product Name:	E1/T1 over Ethernet Multiplexer
Manual Version:	1.0
Last Update:	Mar. 2012

AD-NET TECHNOLOGY, CO., LTD

No.30-3, Lane 393, Yuantong Rd., Zhonghe City, Taipei County 235, Taiwan
Phone: +886 37 269585
Fax: +886 37 265932

info@ad-net.com.tw

TABLE OF CONTENTS

1. GENERAL 1

1.1 OVERVIEW 1
1.2 FEATURES 1
1.3 APPLICATIONS 1
1.4 TIMING MODES 2

2. SYSTEM ARCHITECTURE 4

2.1 FUNCTION DESCRIPTION 4
2.2 STRUCTURE 5
2.3 FRONT PANEL 5
2.3.1 Diagram 5
2.3.2 LED's 6
2.3.3 Dip Switches Definition 7
2.3.4 E1/T1 Port 8
2.3.5 Ethernet ports 9
2.3.6 Power Switch and Power Socket 10

3. INSTALLATION 10

3.1 E1/T1 CONNECTIONS 10
3.2 ETHERNET/OPTIC FIBER CONNECTIONS 11

4. TROUBLESHOOTING 11

4.1 COMMON FAULT DIAGNOSIS AND RULED OUT 11
4.1.1 PWR FAIL LED ON 11
4.1.2 SYS LED does not blink 12
4.1.3 Ethernet Electrical port LINK LED OFF 12
4.1.4 Ethernet optical port L/A LED OFF or OLOS LED ON 12
4.1.5 E1/T1 Alarm LED ON 12
4.1.6 TWO ENDS DEVICES CANNOT CONNECT 13
4.1.7 Both Sides devices of E1/T1 have slip 13

5. WEB MANAGER 13

5.1 SYSTEM INFO 14
5.2 ALARM STATUS 14
5.2.1 E1 Channel Status 14
5.2.2 Ethernet Port Status 15
5.2.3 Power Status 15
5.2.4 Alarm Log 15
5.2.5 BER Test 16
5.3 ALARM MANAGEMENT 16

5.3.1 Alarm Shielding Management 16
5.4 ETHERNET MANAGEMENT 16
5.4.1 Ethernet Management 17
5.4.2 Ethernet Senior Management 18
5.4.3 VLAN Management 19
5.5 E1 MANAGEMENT 21
5.5.1 E1 Service Management 21
5.5.2 E1 Senior Management 22
5.6 SNMP MANAGEMENT 23
5.7 SYSTEM CONFIGURATION 24
5.7.1 System time management 24
5.7.2 Change the password 25
5.7.4 Default parameter recovery 25
5.7.4 Upgrade online 26
5.7.5 Reboot system 28

6. SPECIFICATION 28

6.1 CAPACITY 28
6.2 E1/T1 INTERFACE FEATURES 28
6.3 ETHERNET PORT 29
6.4 POWER 29
6.5 OPERATING CONDITION 29
6.6 DIMENSIONS 29
6.7 WEIGHT 29

7. APPENDIX 30

1. 🕮 General

1.1 Overview

Thank you for selecting the AN-TDM-IP-1E1/2E1-A E1/T1 over Ethernet multiplexer product designed and made by AD-net Technology., LTD The product adopt the innovative TDM over IP technology, with IP circuit emulation that supports transportation of 1~2 E1 /T1 over FE port, that can be used to provide E1 communication channels over Ethernet or IP networks.

In addition, AN-TDM-IP-1E1/2E1-A equipment also support the 2 local Ethernet data access, its internal buildup QoS which set the local Ethernet priority is lower than T1 / E1 data, so as to ensure the T1 / E1 signal priority transmission.

The AN-TDM-IP-1E1/2E1-A have many optional parameters, which can be modified by the user to suite different application requirements. Please read this manual carefully before installing the product.

1.2 Features

- AN-TDM-IP-1E1-A provide 1 channel of E1/T1 over 1 Ethernet adaptive
- AN-TDM-IP-2E1-A provide 2 channels of E1/T1 over 1 Ethernet adaptive
- Provide 4 FE electrical ports (2 for uplink, 2 for user data or monitoring) and 1 Ethernet optical port optical port can be used for uplink or user data.
- Support IETF RFC4553 SAToP protocol, Ethernet encapsulation support IP/UDP.
- User-friendly Web server supported for easy setup and maintenance
- Support SNMP V1/V2 network management
- E1 clock supports 3 mode: local clock, adaptive and loopback
- E1 service support lossless protection
- Ethernet built-in layer 2 switch, support VLAN(802.1Q based and QinQ based), QoS(port based、8021.1P based and TOS based)
- Ethernet support IEEE 802.3x and MAC address automatic learning
- Ethernet packet size up to 9720byte
- Point to point and point to multipoint supported
- Software and hardware online upgrade
- Support SNTP network time setting
- Support software test E1 error

1.3 Applications

AN-TDM-IP-1E1-A could be worked with E1 over Ethernet interface

multiplexer AN-STM-1-IP, make point-to-multipoint application ,and point to point of connection, Typical application is shown in Fig 1.3-1~Fig 1.3-3.

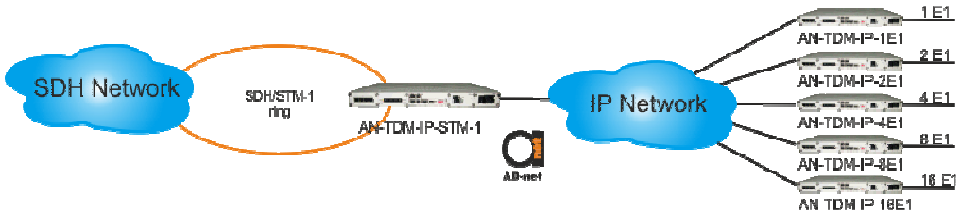

Figure 1.3-1 Convergent Application

Figure1.3-2 Typical application of wireless network

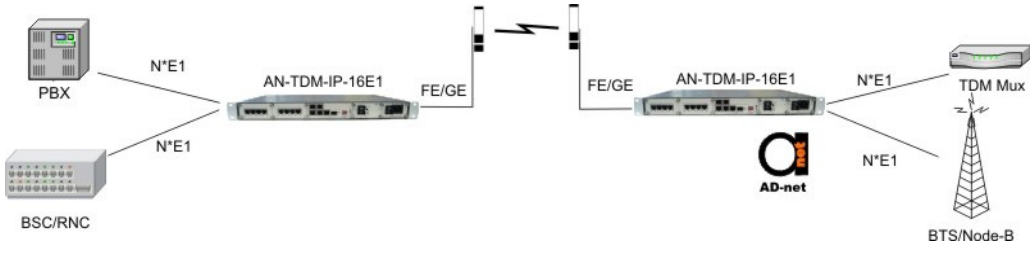

Fig. 1.3-3 The typical application of cable network

AN-TDM-IP-1E1/2E1-A could cooperate with wireless bridge of most manufactories in wireless network application use, At present, some the sold wireless bridge transmission bandwidth change with the Ethernet packets, some Bridges will introduce the packet delay jitter, when work with the different wireless bridge, need to adjust E1/T1 signal seaied length and jitter, in order to get the best transmission effect.

Note : This equipment is used together with the wireless Bridges, usually through reticule and outdoor antenna system of wireless bridge connected, there is lightning risk at this time, must be in an upward in combination of Ethernet lightning protection protector, otherwise lightning will make seriously damage to the equipment, danger to the staff .

1.4 Timing modes

To emulate a transparent E1 channel over a packet network, the AN-TDM-IP-1E1/2E1-A not only conveys data stream content correctly from the source to the destination, but also recovers the E1/T1 timing from the source at the

destination accurately. Packet networks do not provide such built-in timing transparency mechanism as TDM networks do. AN-TDM-IP-1E1/2E1-A uses its proprietary algorithm to reconstruct the E1 clock at the destination. The recovered clock is of very high quality, with low jitter and wander. Typical frequency offset is within ±5ppm, and jitter is below 0.1UI. It can be adopted in most applications. This timing mode of rebuilding the E1 clock at the destination is called Adaptive Timing.

For applications where separate clock distribution network exists, another timing mode, Loop back Timing, may be used for maximum clock quality. In this mode, AN-TDM-IP-1E1/2E1-A rebuilds the E1/T1 output code stream using the clock extracted from E1/T1 input signals. AN-TDM-IP-1E1/2E1-A built-in memory can eliminate the wander completely. It will switch to Adaptive Timing automatically once the input signals are lost.

The two timing modes of AN-TDM-IP-1E1/2E1-A are showed in Fig.1.4-1.

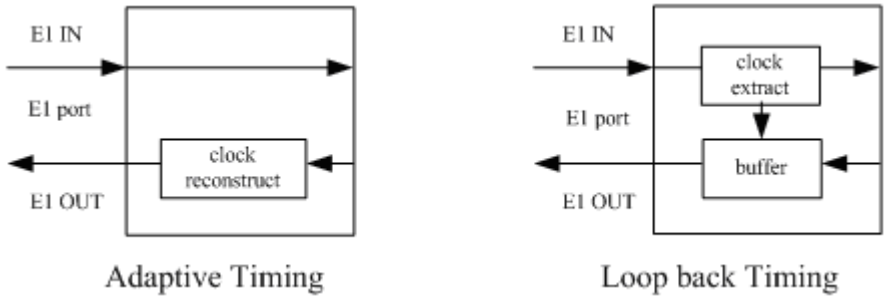

Fig.1.4-1 E1Timing modes

Correct timing mode setting is important for smooth operations. In most cases, setting both units to adaptive timing mode is sufficient. But sometimes, setting one unit to loop timing mode may work better. For example, setting the AN-TDM-IP-1E1/2E1-A unit connected with the clock master (such as local exchange) to loop back mode, and the other unit connected with the clock slave (such as PBX remote module or PCM terminal) to adaptive mode, is probably better than setting both to adaptive modes. It's better to set the both sides AN-TDM-IP-1E1/2E1-A to loop back timing mode when the both sides equipments use synchronous master clock. In another case, set the both sides AN-TDM-IP-1E1/2E1-A to adaptive timing mode when the both sides equipments use asynchronous master clock.

One typical error in telecom applications is to connect two communication devices that are both clock slaves. Neither will AN-TDM-IP-1E1/2E1-A support such operation no matter how the timing modes are set.

Note: The Lock Clock usually takes several minutes to stabilize. During that period, clock drift may exceed the limit, errors and slips may occur.

Various timing schemes are listed in Table 1.4-1, for applications depicted in Fig.1.4-2.

Fig.1.4-2 Timing mode scheme reference diagram

Table 1.4-1 Timing mode schemes

A side Equipment clock mode	B side Equipment clock mode	A side AN-TDM-IP Timing mode	B side AN-TDM-IP Timing mode	Note
master	master	loop back	loop back	Equipment A & B clocks synchronous
		adaptive	adaptive	
master	master	adaptive	adaptive	Equipment A & B clocks plesiochronous
master	slave	loop back	adaptive	
		adaptive	adaptive	
slave	master	adaptive	loop back	
		adaptive	adaptive	
slave	slave			Not allowed

2. 🕮 *System Architecture*

2.1 Function Description

The core of AN-TDM-IP-1E1/2E1-A is the TDM/Packet processing unit. It truncates E1/T1 data stream, and encapsulates the data into Ethernet packet with or without IP headers. The packets are passed to the Ethernet switch unit via MII interface, and are sent out through the uplink ports.

In the reverse direction, packets from the uplink ports are sent to the TDM/Packet processing unit for reassembling the original E1/T1 data stream, and outputting via E1/T1 interface. TDM/Packet processing unit need to process the reassembled data to recover the E1 clock which is the key element of the device. Very sophisticated algorithm is used to ensure that the reconstructed clock will meet the stringent requirement of TDM applications. The most important parameters are bit rate, jitter, wander, and signal delay.

The user can modify various operational parameters through Network Management.

2.2 Structure

AN-TDM-IP-1E1/2E1-A adopt standard 1U box (W x H x D: 195 mm×35 mm×140 mm), which is composed by system board and power supply card. AN-TDM-IP-1E1/2E1-A system structure is shown in Fig 2.2-1:

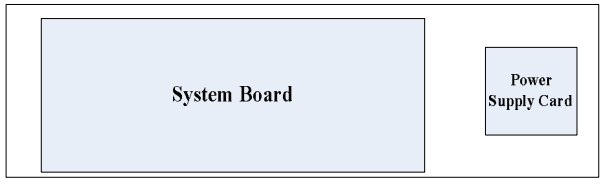

Fig 2.2-1 AN-TDM-IP-1E1/2E1-A system structure

2.3 Front panel

2.3.1 Diagram

AN-TDM-IP-1E1/2E1-A, all service interface ,power port ,indicators and dips are in the front of panel , no indicators or dips in the rear panel , AN-TDM-IP-1E1/2E1-A front panel is shown in Fig 2.3-1~Fig 2.3-4.

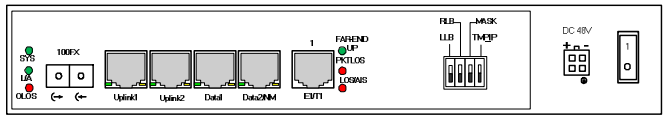

Fig. 2.3-1 Front panel of AN-TDM-IP-1E1/A (DC-48V)

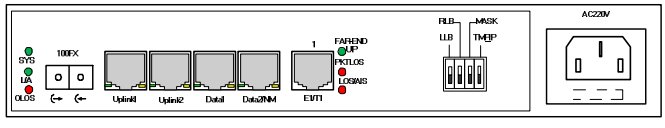

Fig. 2.3-2 Front panel of AN-TDM-IP-1E1/A (AC-220V)

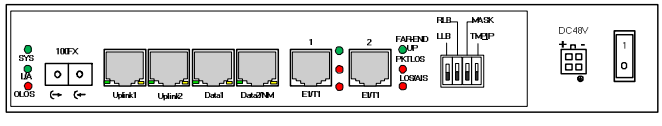

Fig. 2.3-3 Front panel of AN-TDM-IP-2E1/A (DC-48V)

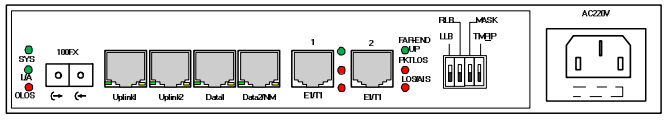

Fig. 2.3-4 Front panel of AN-TDM-IP-2E1/A (DC-48V)

2.3.2 LED's

The definition is shown in Table 2.3.2-1:

Table 2.3.2-1 the indicators definition of AN-TDM-IP-1E1/2E1-A

Identification	Color	Quantity	Definition	Remark
SYS	Green	1	System working state instructions Blink: Normal On: System is on configuration or work abnormally Off: System does not work or abnormally work	
PWR FAIL	Red	1	The power failure alarm instructions On: Power Off / Failure Off: Normal	
L/A	Green	1	0ptical Ethernet interface state instructions On: Connected with remote Ethernet optical interface Off: Not connected with Ethernet optical interface	Optical Ethernet interface indicators
OLOS	Red	1	Optical Ethernet interface receiving instructions On: No receiving Off: Receiving normally	
（Ethernet electrical port LINK）	Green	4	Ethernet electrical interface instructions On: Link normally Blink: Data transmitting/receiving Off: Link abnormally	One link indicator on the left of each Ethernet electrical interface
（Ethernet electrical port FDX）	Yellow	4	Ethernet electrical interface rate instructions: On ： rate is HULL Off ： rate is HALF	One FDX indicator on the right of Ethernet electrical interface

FAR-END UP 1~2	Green	2	1 ~ 2 channel E1 / T1 addressing the remote equipment link state instructions On: Addressing the remote MAC address Off: unaddressing the remote MAC address	
PKT LOS 1~2	Red	2	T1 / E1 service lost package instructions in Ethernet link On: Cannot receive the E1/T1 remote package Blink: Remote E1/T1 lost package or disorderly sequence Off: Remote E1/T1 no lost package and disorderly sequence	
LOS/AIS 1~2	Red	2	E1 / T1 port alarm status instructions On: LOS alarm Regular slow blink: AIS alarm Irregular fast blink: receive HDB3 code ,wrong E1/T1 signal Off: no alarm	

2.3.3 Dip Switches Definition

There are four Dip Switches on the front panel, the definition show in Table 2.3-2.

Table 2.3-2 Dip Switches Definition of front panel

Dip	label	Definition
DIP-1	LLB	E1/T1 port Tx to Rx loop back ON: set local E1/T1 port Tx to Rx loop back OFF: cancel local E1/T1 port Tx to Rx loop back
DIP-2	RLB	E1/T1 port Rx to Tx loop back ON: set local E1/T1 port Rx to Tx loop back OFF: cancel local E1/T1 port Rx to Tx loop back
DIP-3	MASK	Alarm mask set
DIP-4	TMP_IP	IP set ON: restore default IP address 192.192.192.192

		OFF: use the user's Setting IP address

There are 4 group dips on the bottom of panel, used for controlling the E1 / T1 interface impedance and 75 Ω unbalanced interface shell grounding, as the Table 2.3-3.

Table 2.3-3 Dip Switches Definition of bottom panel

Dip	Definition
One	ON: the first channel of E1/T1 Interface impedance is 75 Ω OFF: the first channel of E1/T1 Interface impedance is 120Ω-E1/100Ω-T1
Two	ON: the first channel of E1/T1 Interface shell grounding OFF: the first channel of E1/T1 Interface shell suspended
Three （only SA1602 support ）	ON: the second channel of E1/T1 Interface impedance is 75 Ω OFF: the second channel of E1/T1 Interface impedance is 120Ω-E1/100Ω-T1
Four （only SA1602support ）	ON: the second channel of E1/T1 interface shell grounding OFF: the second channel of E1/T1 interface shell suspended

2.3.4 E1/T1 Port

AN-TDM-IP-1E1-A equipment with 1 channel of 120 Ω-E1/100 Ω-T1 balance interface, AN-TDM-IP-2E1/A equipment with 2 channels of "120 Ω-E1/100 Ω-T1 balance interface, all adopt RJ-48 C form. RJ-48 C joints and wire sequence and signals defined as follows.

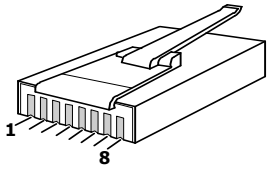

Fig 2.3-5 RJ48-C socket pin sequence

Table 2.3-4 RJ-48C 120Ω-E1/100Ω-T1signal definition

Pin	1	2	3	4	5	6	7	8
Signal	-	+	GND	+	-	GND		
	E1-IN			E1-OUT				

Adopt 75Ω E1/T1 unbalanced interface, can be used for BH4.815.122 conversion cable which convert RJ45 to BNC connector.

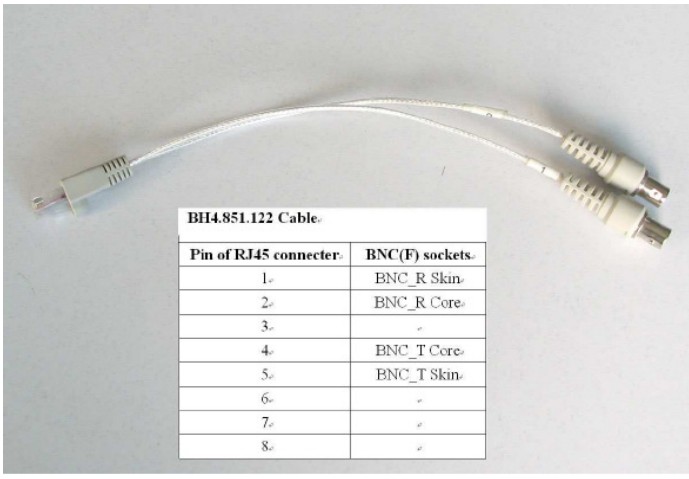

Fig 2.3-6 75Ω dedicated cable

E1/T1 interface provide Rx→Tx、Tx→ Rx loop back operation through network management , it is convenient for operating and maintain test .

2.3.5 Ethernet ports

There are four 100Base-Tx Ethernet electrical ports (two ports are uplink ports used to connect with transmission network and the other two are local data ports used to connect with local Ethernet), and one 100Base-Fx optical port used as either uplink port or local data port. Ethernet electrical port supports three modes: auto-negotiation, 10M full duplex/half-duplex and 100M full-duplex/half-duplex. Ethernet optical port supports auto-negotiation or 100M full-duplex mode.

Ethernet built-in layer-2 switches function. Supporting Ethernet packet size up to 9720byte, VLAN setting based on 802.1Q or QinQ, QoS setting based on port、8021.1P and TOS. There are four priority settings.

Ethernet electrical port adopts RJ45 socket. RJ45 Ethernet socket is defined in Table 2.3-5. Ethernet optical port can use double-fiber SFP optical module and the port labeled（→ is for optical signal output, （← for input. Also Ethernet optical port can use single-fiber optical module which has only one optical interface. Depending on different transmission distance, Different SFP optical module could be selected.

Table 2.3-5 RJ45 socket definition

Pin	1	2	3	4	5	6	7	8
Definition	TxD+	TxD-	RxD+			RxD-		

Note:

1. **At auto-negotiation mode, Ethernet electrical port supports HP auto-MDIX function and it can check the transmission and receiving sequence and make configuration. So both MDI and MDI-X interfaces are supported and both cross line and direct line can be selected.**
2. **Network Management can be used for all the Ethernet ports except Data1 port. But to ensure VLAN setting will not impact the normal monitoring, it's better to use the Ethernet electrical port labeled "Data2/NM" as the network management monitoring interface.**

2.3.6 Power Switch and Power Socket

Two power options are available, ~220V AC or -48V DC. It should be specified at the time of purchase.

3. Installation

3.1 E1/T1 connections

AN-TDM-IP-1E1-A supports 1 E1-120Ω/T1-100Ω balanced interface and AN-TDM-IP-2E1-A can support 2 E1-120Ω/T1-100Ω balanced interfaces. The RJ-48C sockets are default for all the ports. Besides, it can also support 75Ω non-balanced interface by the Dip switches on the rear panel and external impedance converting cable.

E1/T1 interface provide Rx→Tx、Tx→ Rx through NMS, and the loopback of E1 channels can be set up independently. Rx→Tx、Tx→ Rx loop back definition is shown in Fig 3.1.-1:

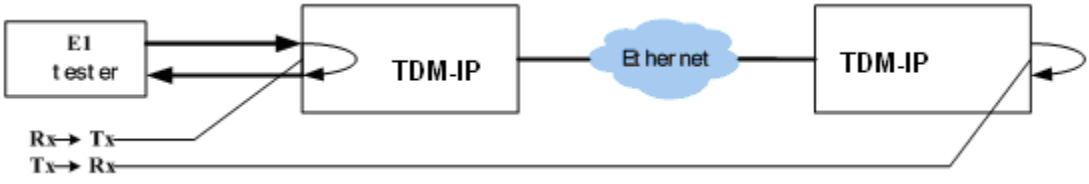

Fig 3.1-1 E1/T1 loop back

Rx→Tx can test E1/T1 connection cable, and Tx→ Rx is used to test the whole circuit including AN-TDM-IP-1E1/2E1-A in the two ends and the link between them.

3.2 Ethernet/optic fiber connections

AN-TDM-IP-1E1/2E1-A provides four 100Base-Tx Ethernet electrical interfaces (two ports are uplink ports used to connect with transmission network and the other two are local data ports used to connect with local Ethernet), and one 100Base-Fx optical interface used as either uplink port or local Ethernet port such as switch.

Ethernet Optical adopts SFP integrated optical modules, and the port labeled（→ is for optical signal output, （← for input. Also Ethernet optical port can use single-fiber optical module which has only one optical interface. The wavelength of single-fiber optical module means its luminescence wavelength, 1310nm or 1550nm. It should note that equipments with the same luminescence wavelength cannot connect with each other. So it should select the equipments with the match luminescence wavelength when using the single-fiber module.

Note:

1. **At auto-negotiation mode, Ethernet electrical port supports HP auto-MDIX function and it can check the transmission and receiving sequence and make configuration. So both MDI and MDI-X interfaces are supported and both cross line and direct line can be selected.**
2. **Network Management can be used for all the Ethernet ports except Data1 port. But to ensure VLAN setting not affecting monitoring, it's better to use the Ethernet electrical port labeled "Data2/NM" as the network management monitoring interface.**

4. Troubleshooting

After power up of equipment AN-TDM-IP-1E1/2E1-A the system should start after 90seconds to work properly. The system completion startup SYS light change from long bright to flashing light. You can observe each interface light to judge each port working statue.

4.1 Common fault diagnosis and ruled out

This paragraph describes common faults that may occur during installation and maintenance. Please seek support from us for other problems.

4.1.1 PWR FAIL LED ON

The PWR FAIL light indicates that the corresponding power supply board is not

complete plugged in or not connected with, please check the following subject: the power supply to meet the requirements or not, the power plug is connected, the switch is open.

4.1.2 SYS LED does not blink

After star up 90 seconds or during working statue, the SYS light flashing that is mean system have not start up completion or program problem, you can turn off the power and reboot, if still does not start up properly you need to find supplier for technical support.

4.1.3 Ethernet Electrical port LINK LED OFF

Ethernet electrical port LINK light off indicates that corresponding Ethernet port does not connect properly. You can check the cable connection, cable line ordering, under mandatory mode does it using the straight-through cable (crossover cable), the electrical interface connection does match the client configuration whether, and connection with network device is working properly or not.

4.1.4 Ethernet optical port L/A LED OFF or OLOS LED ON

Ethernet optical ports L/A light off indicate that the corresponding Ethernet does not establish connect properly. The OLOS light on indicates no received light. Can check the corresponding fiber is connected or not, the using single-fiber module and the equipment connected to the same emission wavelength (should using wavelength as pair optical modules), and device working properly or not.

4.1.5 E1/T1 Alarm LED ON

There are two groups of LEDs, PKT LOS and LOS for E1 alarms LEDs.

When E1 LOS LED is on, loss of E1 signal fault is detected by AN-TDM-IP. Possible causes include:

- The downstream equipment such as telephone exchange or PCM terminal is powered off.
- The E1 cable connection looses or broken.

E1 LOS LED blinks when respective input E1 signal is AIS, i.e. the content of E1 data is all 1. Such alarm indicates fault conditions on the part of the downstream equipment.

E1 LOS site is controlled by Dip Switch RA state. When RA Dip Switch ON, the red LEDs indicate remote E1 LOS state. When RA Dip Switch OFF, the red LEDs indicate local E1 LOS state.

4.1.6 TWO ENDS DEVICES CANNOT CONNECT

Both sides of devices in the same Ethernet broadcast domain, checking both side of device IP address should on dual relationship. Check MAC address is unique (include other device on the same network); Using Ping command to check network, checking bandwidth is sufficient or not.

If two sides of devices are not in same Ethernet segment, checking device IP default gateway setting, IP address, IP address mask, and check conflicts of MAC address or IP address; check bandwidth is sufficient. IP address and gateway address can be set by NMS, MAC address set by manufacture.

Check both ends of the device VLAN setting should be in accordance with eachother.

4.1.7 Both Sides devices of E1/T1 have slip

Check both sides devices AN-TDM-IP-1E1 E1/T1 clock setting, at least one of device should be Master-Clock.

Check AN-TDM-IP-1E1/2E1-A time mode setting. If both sides of the E1/T1 equipment are not in the state of the synchronization, units timing model must be adaptive timing, not loop timing.

At beginning of startup, slip is normal.

5. 🕮 Web Manager

AN-TDM-IP-1E1/2E1-A support Web Server to monitoring devices. Login Web Server need Username and Password, the default Username and password are “admin”, as below picture showed, at System setting you can change it.

All Web Server include 7 parts: System Info, Alarm Status, Alarm Management, ETH Management, E1 Management, SNMP Management, and System.

Following will introduce the Web Server Management of AN-TDM-IP-1E1/2E1-A.

5.1 System Info

After login Web Server, will show Welcome page. In this page include Hardware version number, Software version number, Web manager version number, IP address, Subnet Mask, Gateway IP address, MAC address. IP address and Subnet address and Gateway address can be set by customer, other only for checking. As shown in Fig 5.1-1. The default setting IP address is 192.168.1.2.

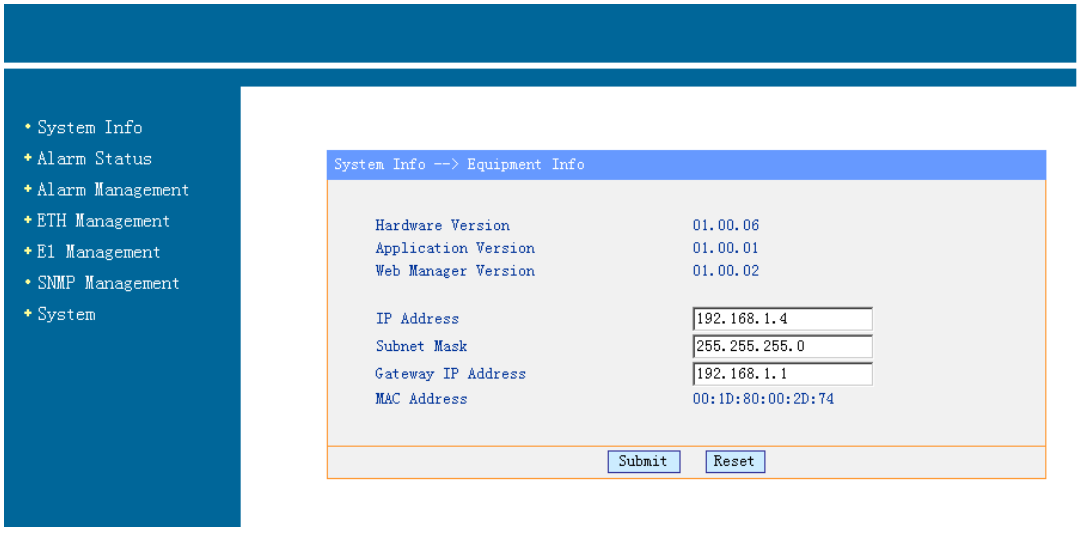

Fig 5.1-1 System Info

5.2 Alarm Status

5.2.1 E1 Channel Status

Click left side of Alarm Status—Channel will show E1 Channel Service name, Loop status, E1 port LOS, AIS alarm and calculation of LOS, Remote Connection Status. E1 loop for testing connection, definition of LOOP please check 3.1.2. E1 Loop setting after submitting will changed, but not saved, after device startup E1 not in Loop stats. Please check Fig 5.2-1.

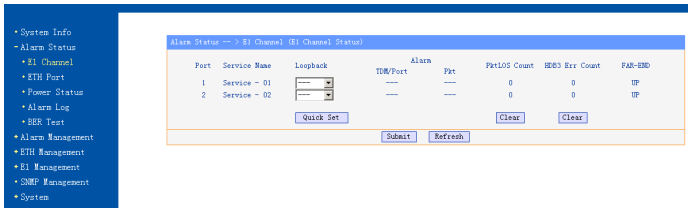

图 5.2-1 E1 Alarm Status

5.2.2 Ethernet Port Status

Click Left side Alarm Status – ETH Port will show 4 Ethernet electrical ports and 1 optical port LINK UP/DOWN stats, as shown in Fig5.2-2.

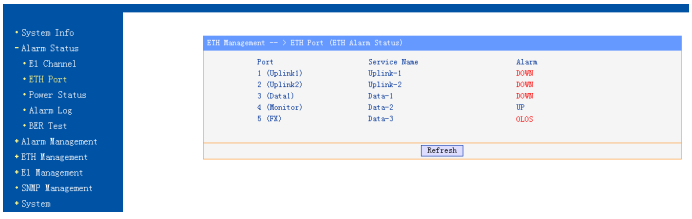

Fig 5.5-2 ETH port Alarm Status

5.2.3 Power Status

Click left side Alarm Status – Power Status will show Power Alarm Status, include 2 power ad Status information, as shown in Fig 5.2-3.

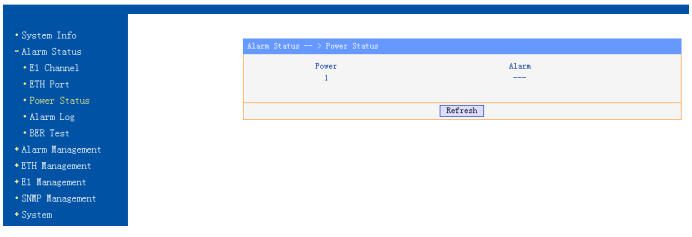

Fig 5.2-3 Power Status

5.2.4 Alarm Log

Click Left side Alarm Status – Alarm Log, include Alarm Type, Alarm Item, Port number, time. As shown in Fig 5.2-4.

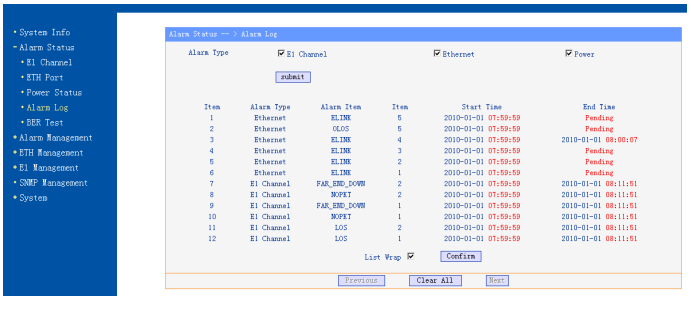

Fig 5.2-4 Alarm Log

5.2.5 BER Test

Click BER Test will show picture as below, include BER Enable, Testing Port, Start and Stop, Port Status (Frame synchronization or Frame Desynchronization), Bit Error Rate and Error timing, as shown in Fig 5.1-5. If you need test Error for one link, first you should click “enable” and “start”, and click “Submit”, Web Server will show result. During Testing click “Refresh” will show result of now status.

Fig 5.2-5 BER Test

5.3 Alarm Management

This section includes E1 channels, Ethernet port and power alarm shielding.

5.3.1 Alarm Shielding Management

If set alarm mask, then this alarm will be shielded at alarm log, alarm indicator on panel and will not display no matter what situation is unless the mask is canceled. E1 channel supports not only shielding any alarm of any channel, but also batch shielding. But Ethernet port alarm and power alarm shielding can only be set one by one. As shown in Fig 5.3-1 and Fig 5.3-2.

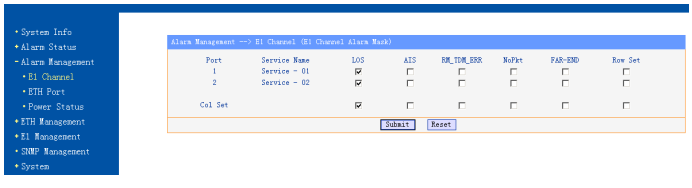

Fig.5.3-1 E1 alarm management

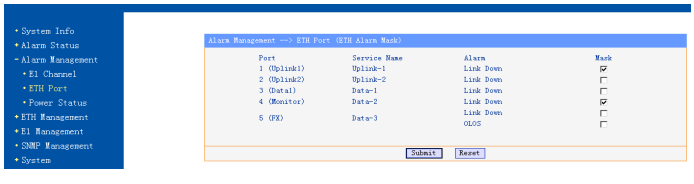

Fig.5.3-2 Ethernet alarm management

5.4 Ethernet Management

This section includes Ethernet port management, Ethernet senior management

(MAC address aging time, QoS management and port Throughput limiting) and VLAN management.

5.4.1 Ethernet Management

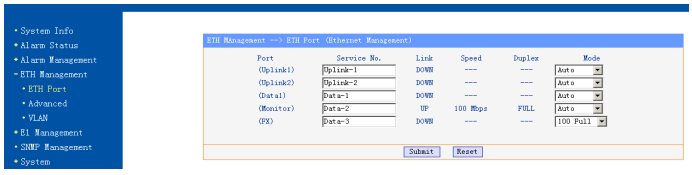

Fig.5.4-1 Ethernet Management

Table 5.4-1 Ethernet management parameters

Parameters		Options	Explanation
Ethernet Management	Port		5 Ethernet ports number
	Service No.		Ethernet service No.: support at most 15 capital/small letters, digit and part special character input. Chinese character support 7 numbers(not support some special characters, as “ / ”、 “ \ ” input).
	Link		Link: indicate current Ethernet link(Up/Down)
	Speed		Speed: indicate current Ethernet port speed(10/100Mbps)
	Duplex		Duplex: indicate current Ethernet work mode (HALF/FULL)
	Mode	Auto ,100 M full, 100M half, 10M full, 10M half	5 Ethernet ports work mode configuration: Auto-adaptive (default) 100M full 100M half 10M full 10M half Electrical interface work modes have Auto, 100M full, 100M half, 10M full and 10M half. Optical interface work modes have Auto and 100M full

Note: The sentence with underline is default settings.

5.4.2 Ethernet Senior Management

Ethernet senior management supports MAC address aging time, Ethernet port QoS management and throughput limiting. MAC address aging time range is 0~99999 s (default: 300s).

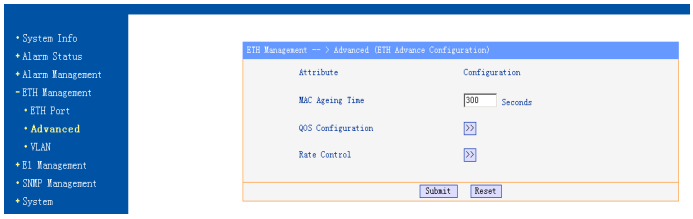

Fig 5.4-2 Ethernet management

For Ethernet interface 1~5, we can enable QoS (based on port, 802.1p and TOS)

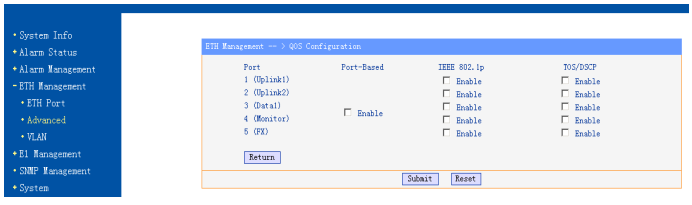

Fig 5.4-3 Ethernet QoS configuration

Port throughput limiting of Ethernet senor management includes enable Ethernet port throughput limiting and speed configuration (supporting entry speed limiting). As shown in Fig 5.4-4. Speed class of Ethernet interface is shown in Table 5.4-2. When we configure the maximum port speed, if the value is not equal to any speed class, it will select the lower speed class proximal to this value. For example, value is set to 70, after clicking Submit, the value will change to 64, means the maximum speed is 64KB.

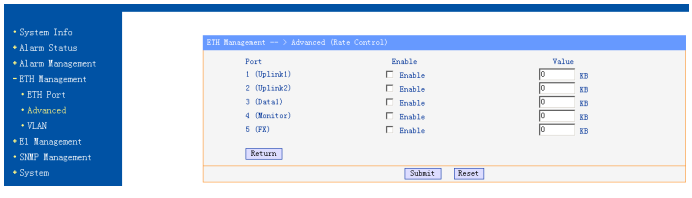

Fig 5.4-4 Ethernet senior management

Table 5.4-2 Speed class of Ethernet interface

Speed limiting range	speed class interval	minimum speed	maximum speed
Lower than 2M	64KB	64KB	1.792MB
Higher than 2M，lower than 100M	1MB	2MB	100MB

5.4.3 VLAN Management

Two uplink Ethernet electrical interfaces support 1+1 protection. After enabling 1+1 protect, equipment configure Q in Q VLAN automatically and user only need to configure VID of uplink Ethernet electrical interface and monitoring port. As shown in Fig 5.4-5 and Fig 5.4.6.

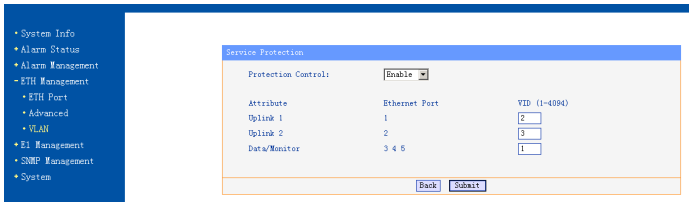

Fig 5.4-5 uplink 1+1 protect configuration

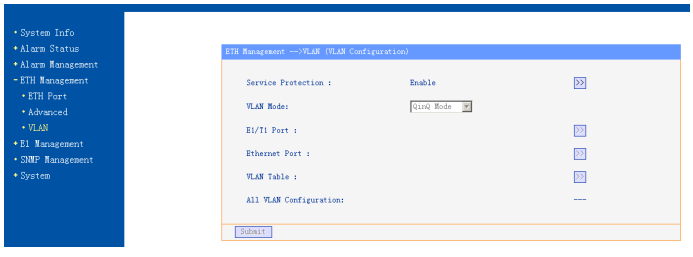

Fig 5.4-6 configure Q in Q VLAN automatically

AN-TDM-IP-1E1/2E1-A Ethernet supports 802.1 Q VLAN and Q in Q VLAN. 802.1Q VLAN is that adding the VLAN tag in front of Ethernet frame type. Q in Q VLAN is that nesting the VLAN (S-Tag) of operators in 802.1Q outer layer to enable the VLAN stacking. VLAN management parameters are shown in Table 5.4-3.

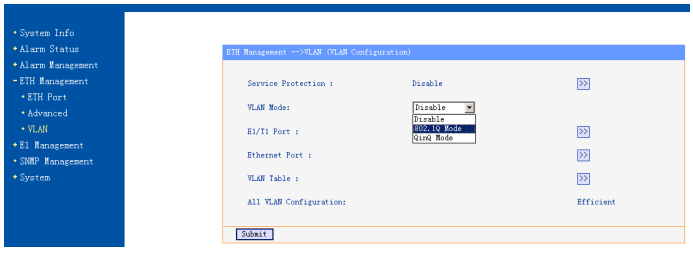

Fig 5.4-7 VLAN management 1—VALN configuration

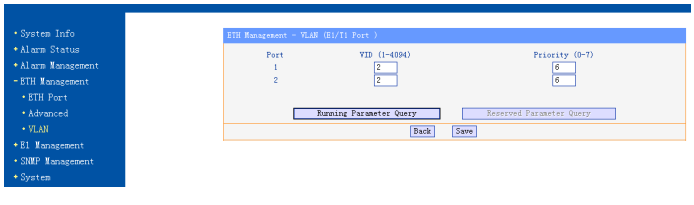

Fig 5.4-8 VLAN management 2—E1 port configuration

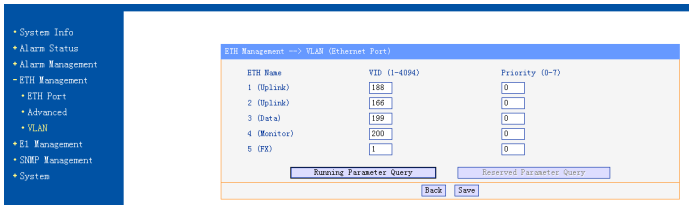

Fig 5.4-9 VLAN management 3—Ethernet port configuration

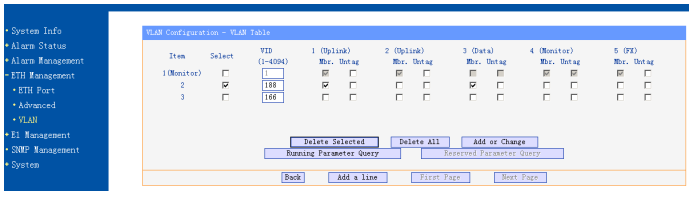

Fig 5.4-10 VLAN management 4—VLAN Table

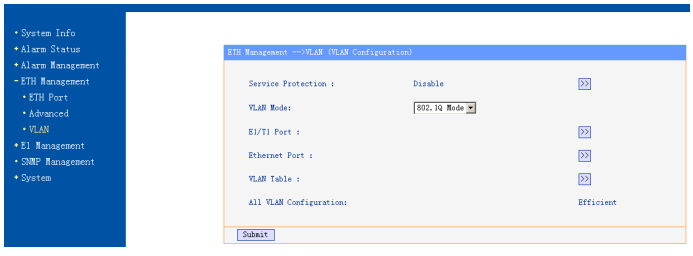

Fig 5.4-11 VLAN management 5—VLAN configuration confirmation

Table 5.4-3 VLAN management parameters

Parameters	Options	Explanation
VLAN Mode	Disable	No VLAN tag
	802.1Q	Add the VLAN tag before Ethernet frame type.
	Q in Q	Add operators VLAN (S-Tag) in 802.1Q. Realizing VLAN stack.
Service Protection	Protection Control	Disable: not supply slave transmission channel. Enable: Both master and slave transmission channels transport service and no data loss during protection switching.
	Attribute	Attribute of 1~5 Ethernet port, including uplink port and data/monitoring port.
	Ethernet Port	Ethernet port number 1~5.
	VID	VLAN ID, support 4094 VLAN, ID, range (1-4094)
E1 Channel	Port	E1 端口序号 1～2

Parameters	Options	Explanation
VLAN Configuration	VID	VLAN ID, support 4094 VLAN, ID, range (1-4094)
	Priority	Define customer priority, including 8 PRI degrees (0-7). PRI is higher when this number is bigger.
Ethernet Port VLAN Configuration	Eth Name	Ethernet port number 1~5.
	VID	VLAN ID, support 4094 VLAN, ID, range (1-4094)
	Priority	Define customer priority, including 8 PRI degrees (0-7). PRI is higher when this number is bigger.
VLAN Table	VLAN table configurations, inquiry, add and delete.	
	Select	When adding VLAN group or VLAN members, property configuration changed, it should be tick off.
	VID	VLAN group ID, support 1-4094
	Mbr.	VLAN group member, it will be VLAN member when tick off
	Untag	tagged/untagged, ticking off means (untag)

Note: According to the PVID value of Data2/NM port, it will automatically generate a default monitoring VLAN entry and it cannot be changed. If it needs to modify the monitoring VID value, it needs to modify the PVID of monitoring port.

5.5 E1 Management

E1 management includes E1 service management and E1 senior management. Every section has many parameters setting. As shown in Table 5.5-1:

5.5.1 E1 Service Management

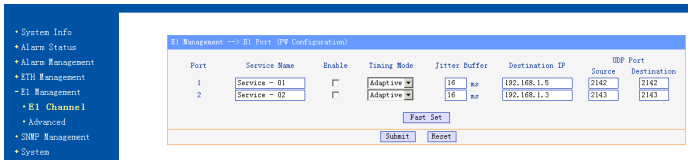

Fig 5.5-1 E1 channel Management

5.5.2 E1 Senior Management

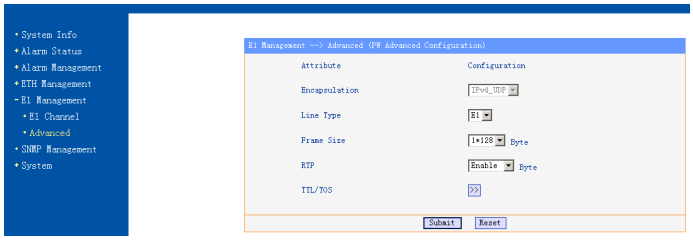

Fig 5.5-2 E1 channel senior Management

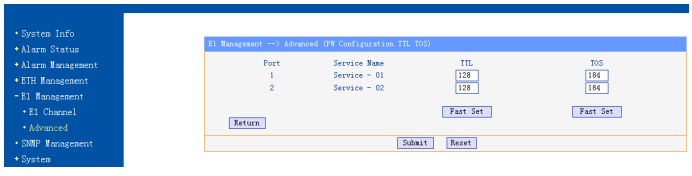

Fig 5.5-3 TTL/TOS configuration of E1 channel Management

Table 5.5-1 E1 Management parameters

Parameters		Selections	Explanations
E1 Channel	Service Name		E1 service name
	Enable		Enable this E1 channel. Default: disable
	Timing Mode	Adaptive	Adaptive mode:E1 timing from remote E1 stream
		Loopback	Loop back mode:E1 timing comes from local E1 stream
		Local	Local mode: E1 timing comes from local equipment crystal oscillator
	Jitter Buffer	4~256ms	Jitter absorption buffer: worked with the link with bigger jitter, used to buffer the receiving packets. Coming packets buffer to eliminate jitter. Range：4~256ms Default: 16ms
	Destination IP		Remote end IP address；4 E1 line IP addresses can be set separately Default 192.168.1.3
	UDP Port	Source	UDP Source Port: Effective range:1024~65535
		Destination	UDP Destination Port: Effective range:1024~65535

Parameters		Selections	Explanations
Advanced	Encapsulation	IPv4_UDP	IP Encapsulation
	Frame Size	1×128 byte	Every Ethernet packet encapsulation length can select 1×128/2×128 字节/4×128 byte. The longer the packet is, the more E1 data encapsulated in the packet, the lower expense ratio is, the higher bandwidth efficiency is and the bigger time delay is. Vise versa. Default: 2
		2×128 byte	
		4×128 byte	
	RTP	Enable	Real-time Transport Protocol, used to define E1 time Stamp. Default: Enable
		Disable	
	TTL/TOS		TTL: Time To Live, Default: 128 TOS: Type Of Service, Default: 184

Supplementary item:

Whether E1 bandwidth is auto-adaption depends on whether enable this E1. **Suggestion:** If this E1 is not used, it is better to let this E1 channel disabled.

5.6 SNMP Management

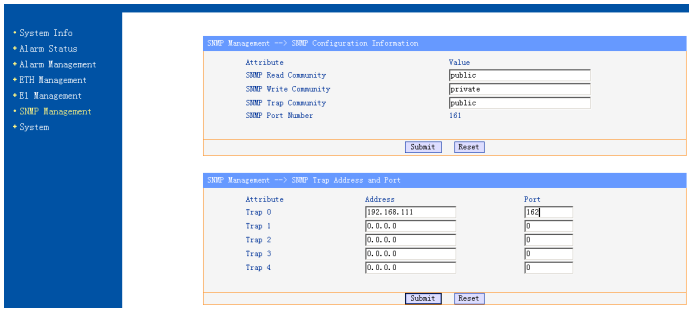

Fig 5.6-1 SNMP management

Table 5.6-2 SNMP management parameters

Parameters		Option	Explanations
SNMP Configuration Information	SNMP Read Community		Read commands of device nodes (Read-only) Default: public

Parameters		Option	Explanations
	SNMP Write Community		Configure commands of device nodes Default: private
	SNMP Trap Community		Receive commands of Trap Default: public
	SNMP Port Number		The communication ports connecting the devices with SNMP, SNMP protocol, Default: port: 16
SNMP Trap Address and Port	SNMP Trap Address		Address used to receive Trap information: The most addresses and ports can be set is up to 5. That means the device can sent Trap information to 5 network management equipments. SNMP Trap Address needs to be configured at the first time(initial value: 0), but it can be saved and recovered.
	SNMP Trap Port		Ports used to receive Trap information: it needs to be configured at the first time (initial value: 0), but it can be saved and recovered.

5.7 System Configuration

This section includes time configuration, change the password, Default parameter recovery, upgrade online and reboot system.

5.7.1 System time management

System time can be modified in three ways: manually enter the time, Get Local Time or SNMP network time. As shown in Fig 5.7-1.

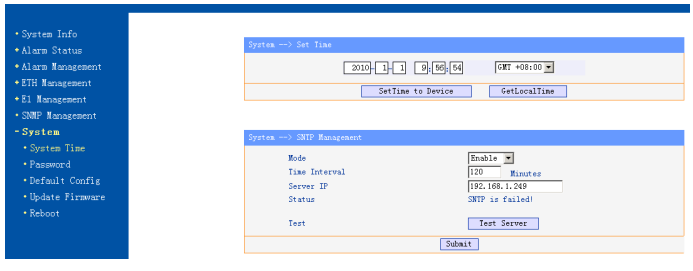

Fig 5.7-1 system time management

SNMP management includes SNMP server option (stop/start/test), time setting interval (10~60000 minutes), SNMP server IP address and SNMP server status display (disable/enable, connect successfully/fail).

Note: It needs to get the current time again once the power is off.

5.7.2 Change the password

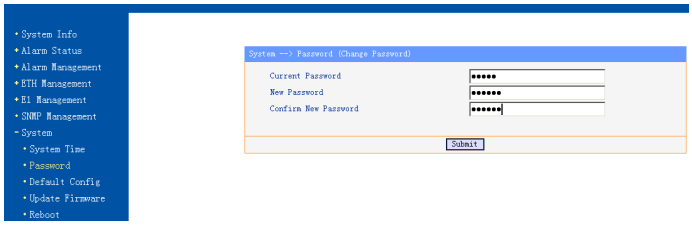

Fig 5.7-2 Change the password

The change will be valid after confirm the submitting.

5.7.4 Default parameter recovery

Default parameter recovery can make all the parameters recover to factory default except the IP address of equipments and the devices will reboot automatically. If not selected to remain current IP, IP address will also recover to factory default (192.168.1.2). At the same time, due to the change of IP, it will show Access failed. Then we need to restart Web Server.

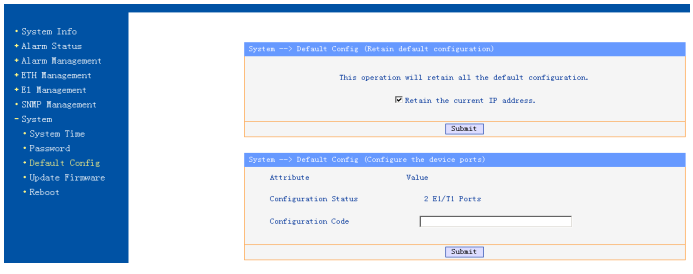

Fig 5.7-3 default parameters recovery

AN-TDM-IP-1E1/2E1-A supports changing E1/T1 port number. For example, change AN-TDM-IP-2E1/A E1/T1 port number to 1. It is shown as follows:

Step 1. Generate the configuration code by verification code. Input the MAC address of AN-TDM-IP-2E1/A and set E1 number as 1 and then click Generate.

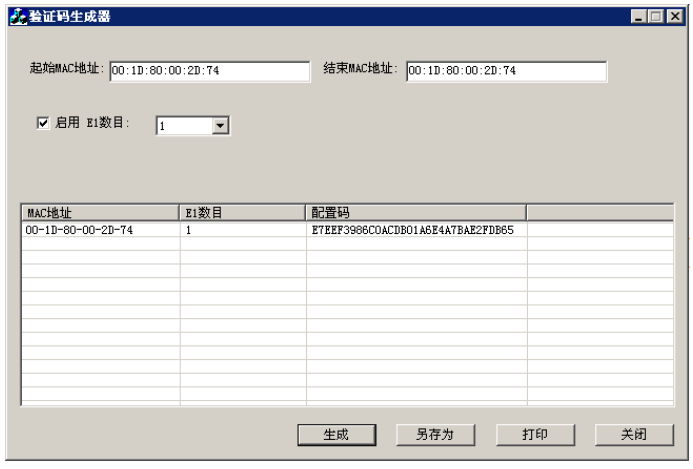

Fig 5.7-4 generate configuration code

Step 2. Input the configuration code and click Submit.

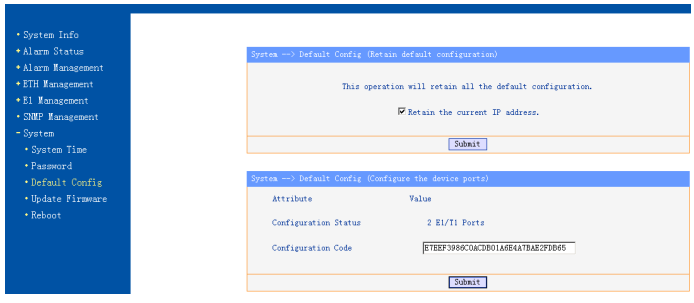

Fig 5.7-5 change E1/T1 port number

Step 3. Check the E1/T1 number in Configuration Status to confirm whether the change is successful.

Fig 5.7-6 change is successful

5.7.4 Upgrade online

Both AN-TDM-IP-1E1/2E1-A hardware and software program can be upgraded by ftp. Following will introduce Web Server upgrade online operation.

Step 1: Use any FTP tool or input ftp://root:root@192.168.1.2/home/ftp directly in My Computer address bar to access the ftp server. And then copy the

upgrade program to the server, as figure 5.7-7.

Note: Hardware program file name is H_Patch.r, and software program file name is S_patch.r. The file name cannot be changed.

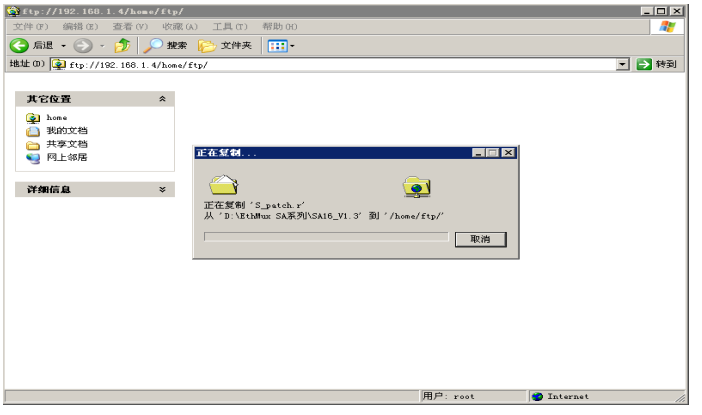

Fig 5.7-7 upgrade online 1—upload upgrade program

Step 2: Select program type (it is available to select software and hardware at the same time) and click Upgrade to start.

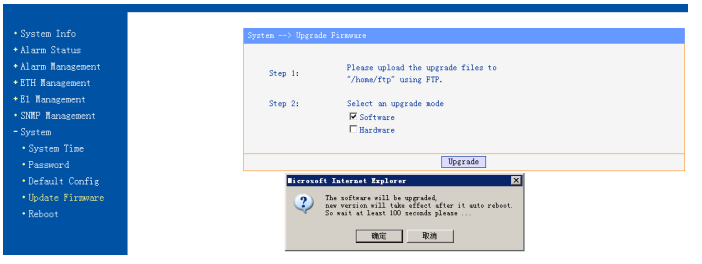

Fig 5.7-8 upgrade online 2—select a file/files to upgrade

It may take several minutes to complete the upgrade. During the upgrade, we can refresh to check upgrade progress.

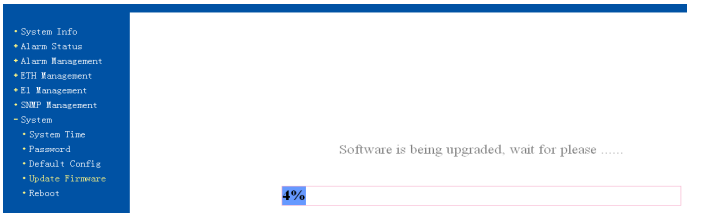

Fig 5.7-9 upgrade online 3—during the upgrade

When the upgrade is done, click Confirm to reboot the equipment. Login Web management again to check the version number and confirm the upgrade is successful.

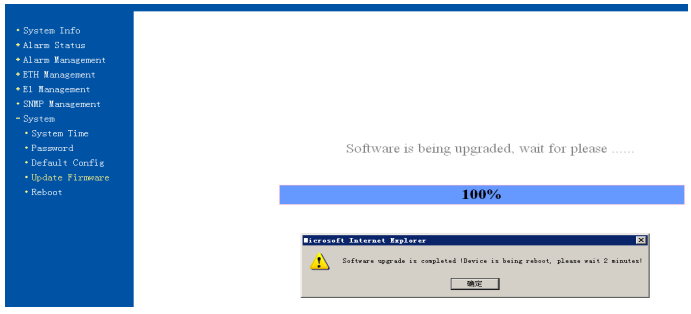

Fig 5.7-10 upgrade online 4—operate successfully

Note: If the power is off during upgrade, it may make equipment not start and need to program procedures with download line.

5.7.5 Reboot system

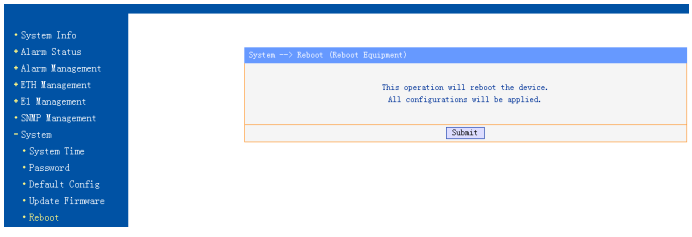

Fig7.7-11 Reboot equipment

6. Specification

6.1 Capacity

AN-TDM-IP-1E1-A: 1 E1/T1 interface, 4 100Base-Tx Ethernet electrical ports，1 100Base-Fx Ethernet optical port；AN-TDM-IP-2E1/A: 2 E1/T1 ports，4 100Base-Tx Ethernet electrical ports, 1 100Base-Fx Ethernet optical port.

6.2 E1/T1 Interface Features

Comply with ITU-T G.703 recommendation

End-to-end delay (minimum delay setting): ≤ 10ms

Output frequency offset (adaptive timing, stabilized): ≦5 ppm

Output jitter (adaptive timing): ≤ 0.1UI

Interface Impedance: default：E1-120Ω/T1-100Ω; Supporting 75Ω

Connector: RJ-48C

Ports: AN-TDM-IP-1E1-A: 1 E1/T1 port

H0FL-AN-TDM-IP SA1602: 2 E1/T1 ports

6.3 Ethernet Port

Comply with IEEE 802.3、802.1Q、802.1ad、802.1P and relative other protocol.

Operating Mode： 10M/100M Adaptive, Half/Full Duplex Adaptive

MTU: 9720byte

Connector： 100M Electrical port: RJ45

100M Optical Port: LC

Interface no.: 100M Electrical Port： 4

100M Optical Port: 1

6.4 Power

AC: 100V~260V/50Hz ~60Hz (fuse: 1A)

DC: -36V ~ -72V

Power Consumption: ≤4W

6.5 Operating condition

Temperature: (0～45) ℃

Humidity: ≤90％RH (non-condensing)

6.6 Dimensions

Width × Height × Depth (mm): 195× 35 × 140

6.7 Weight

≤ 3.5 kg

7. 🕮 *Appendix*

Specialized terminologies and acronyms:

Acronym	Explanations
TDM	Time Division Multiplex
SAToP	Structure-Agnostic TDM over Packet
DSCP	Differentiated Services Code point
UDP	User Datagram Protocol
QoS	Quality of Service
TOS	terms of service
TTL	Time To Live
VLAN	Virtual Local Area Network
RTP	Real-time Transport Protocol
SNTP	Simple Network Time Protocol